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ABSTRACT

A brief case history describing a situation in which two administrative areas of a college joined to outline a program for the resolution of a budgetary control problem is presented. Adjunct instructional costs had been escalating but with the onset of city and state fiscal constraints it was essential that such costs be controlled. Part of the problem was the lack of a controlling mechanism to ensure that departments could not introduce more sections of courses then the college could afford. A representative of the college's campus center was consulted after most of the variables and formulas for an academic planning system had been identified. The data entry program used to construct the college's Master Course File accessed a table of approved instructional hours (previously determined as falling within budgetary limits) so as to reject sections that exceeded these hours. During registration, the enrollment in any section could be accessed using a terminal. In the future, the college hopes to apply historic data concerning student enrollment patterns to project the needs for specific numbers of sections on the Master Course File. (SW)

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Decision Support: The End-User Finally Gets What He Wants

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This is a brief case history describing a situation in which two administrative areas of a College joined to outline a program for the resolution of a budgetary control problem which was confronting them. Adjunct instructional costs had been escalating but with the onset of City and State fiscal constraints it was essential that such costs be controlled. Only after most of the variables and formulas had been identified was the systems analyst called in. The data entry program used to construct the college's Master Course File accessed a table of approved instructional hours (previously determined as falling within budgetary limits) so as to reject sections which exceeded these hours.

Due to the excellent cooperation exhibited by the individuals involved a very efficient system has been developed which has the potential for even greater applicability.

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I. Introduction

Whether we in the computer business like it or not, the user of computer services has finally caught up with us and is demanding his rights as an equal partner. The days of substituting our perception of his ideas for his real needs are numbered. The user's general dissatisfaction with the performance of computer support led to his doing something about it. With the availability of microcomputers and their companion the spread sheet modeling tool, the user can purchase his own computer support. Or at least thinks he can. The inefficiency of the final system no longer stands in the way of his doing what he wants to do. And if the value of the output is not always cost justified it doesn't really matter so long as that support is what he needs to get the job done. The user strives for equal rights.

Our college, N.Y.C. Technical College, is a conservative institution where change comes about with great difficulty. It's an institution that rarely looks beyond its walls for solutions to problems. It is quite content to attempt to resolve its own problems even if this means sometimes reinventing the wheel.

Did we experience "decision support"? It's hard to say. Our intent was to do some good old-fashioned systems development which would include the user from the beginning and keep him involved throughout the development cycle. Decision Support? It seems computer people have always been supporting the decision-making process. The only question has been the quality and sensitivity of that support.

So from a computer point of view, let's set the scene which our management players are about to enter. The track record of our computer people was not good. Often they had gone ahead and developed systems without knowing exactly what the user had in mind. Their justification was that the user really didn't know what he wanted but, he wanted something. So why not go ahead and develop a system based on what we the computer experts thought was wanted? Once the system has been delivered, there is time to make changes to satisfy the user's needs. Let him use the system which "doesn't do what he wants" and he'll eventually realize what he does want. What a way to build credibility!

As to our communications with the user, we were more concerned with rapid, forward movement than listening to what the user wanted. We often started the design phase before completing the analysis. And when the user was slow to answer our questions, we eagerly provided the answers for him. Sometimes we didn't even bother to ask the questions. After all, wasn't a wrongly developed system better than no system at all? If we guessed right, then he'll have the system he

ordered. If not, we'll merely change the system to meet his needs. Unfortunately some of the changes pointed up major structural defects in our system. Now we had the ultimate challenge: make the system do what it wasn't intended to do! Confidently we charged ahead patching the system to "make" it work. We were in our glory.

Looking back on it, how could such systems development have resulted in anything but an unfriendly, unpredictable and totally frustrating experience for the user. And our credibility? Could there be any?

II. THE PROBLEM

At the beginning of fiscal 1975 New York City was faced with a massive budget crisis which many of you may recall hearing and reading about. The city was tottering on the brink of bankruptcy. Since our school (at that time named New York City Community College) was funded by the City it was drawn into this fiscal quagmire by an initial cut of $2.2 million dollars to the college's operating budget. The budget director attempted to cope with this problem but was frustrated by the inflexible computerized budget system he had inherited. Characteristic of the situation during that period, users had not been consulted when the computer center created systems. As an example of this inflexibility, it took two hours to transfer a faculty member on the budget from one department to another. The system, therefore, was useless in being able to provide timely information for administrative decision making.

About that time, the budget director became aware of the capabilities of the rapidly growing field of telecommunications. As a dedicated professional, he proceeded to utilize his home telephone to hook into the main frame of the CUNY computer and began development of a more satisfactory system. Using a word processing language called Wylbur he created a flexible, internal cost-centered (departmental) budget system which continues to serve the college in good stead. More than thirty programs written in the Wylbur language can be run against the file to establish planning files or spread sheets. The system permits analysis and/or impact studies of budget reductions or personnel shifts.

A. Background and History

New York City Technical College is a two-year career-oriented unit of a large urban university (City University of New York). In July 1980 the State of New York assumed total responsibility for the fiscal support of the college rather than sharing the responsibility with the City of New York as had been the case previously. As a consequence, the

name of the college was changed from New York City Community College to New York City Technical College. This change carried with it new constraints with respect to budget operations. It became apparent that the budget development process and budget control would have to become more computerized than had been the case up to that point. A major reason for this was that the state budget procedures severely limit the college's ability to transfer funds and/or personnel from one major purpose to another.

The particular area of concern for the presenters of this paper was the fact that the college's budget for adjunct (part time) instructional services invariably was exceeded. Whereas prior to 1980 it had been possible to compensate for these deficits via budget modifications, the newly imposed state restrictions made it mandatory that allocated amounts for adjunct services could not be overexpended.

So that the reader may have some appreciation of the magnitude of the overall operation, the following figures are provided:

1983/84 Total Operating Budget	$34,500,000
1983/84 Total Instructional Adjunct Budget	$ 3,200,000
Student Headcount (Fall 1983)	12,100
Full Time Equivalent Students (FTE)	9,700
Number of Full Time Teaching Positions	379
Number of Unique Adjunct Positions	420
Number of Multiple Adjunct Positions	181
Total Number of Sections Offered (Fall 1983)	2,350

Three other factors must be mentioned as integral components of the budget picture:

a) The Full Time Equivalent student count is directly proportional to the credits generated by the students; a sufficient number of sections must be provided to produce the targeted credits.

b) A tuition revenue figure is established by the State as an offset to the college's operating budget. Thus, a specific number of full time and part time students must be enrolled to generate this revenue.

c) A student-faculty ratio, based upon state-wide averages for each academic discipline, is used by the Budget Bureau to staff the college. Adequate enrollment in the sections being offered must be insured to maintain these ratios.

As part of the general background to our paper, it should be pointed out that the Office of Academic Affairs had been involved in some less than satisfactory situations with the college Computer Center. Some of the systems which had been implemented involving personnel records and other management information reports were often developed by Computer Center personnel with minimal or no involvement on the part of Academic Affairs.

B. Specific Problem

In the Fall 1982 the college expended 53% of its allocated budget for adjunct services while generating only 47% of its student credits. It was apparent that if the situation were repeated in the Spring semester we would be facing a potential budget deficit of $300,000. Part of the problem was that the final version of the Master Course (section) File contained more sections than had been authorized initially by the Office of Academic Affairs. During the hectic period of registration, when departments requested the opening of additional sections, it was impossible to monitor the financial impact of such newly added sections. It was assumed that other sections would be cancelled due to insufficient registration but such guesstimates were nebulous at best. To exacerbate this situation, the college operates under a contractual agreement with the union whereby an Adjunct Instructor who is assigned and reports to the first meeting of a class must be paid for the entire semester. Thus, even if a section were cancelled after the start of class, the college was obligated to pay the Instructor assigned. The recognition by the administration of the impending disaster led to a meeting at which the President directed the Dean of Instruction and the Director of the Budget to insure that the adjunct budget would not be overexpended.

It should be pointed out, in fairness, that planning had always taken place re the staffing and scheduling of the instructional program. The problem, essentially, was the lack of a controlling mechanism to insure that departments could not introduce more sections than the college could afford to pay for.

Another less critical but nevertheless significant contributor to the deficit situation was the amount of released time which departments assumed for themselves. Whereas primary responsibility for granting such released time lay within the purview of Academic Affairs, some departments arbitrarily took more than the authorized amount with resulting inflation of their adjunct budget.

The Budget Director and the Dean of Instruction, having been colleagues for many years, agreed to analyze the problem and to

formulate solutions. Following extensive brainstorming discussions, these two individuals met with a representative of the College's Computer Center to specify their needs. The users decribed in considerable detail the specific components of the system which they envisioned. It was then left to the Computer center to translate and deliver an operational package according to the specifications.

C. Program Description

The proposed program was designated as APEF which stands for Academic Planning Echo Form. As seen by its developers, the program would integrate the following factors:

-The number of full time instructors available in each academic department

-The amount of released time assigned to these departments

-The potential service to be provided via grant funds or by other departments

-The projected targets (credit generation) required of each department

-The total number of instructional hours projected for each department

By calculating the net full time availability and subtracting this figure from the instructional hourly requirement, the number of adjunct hours could be determined. Using average hourly costs for each department, an estimate of the department's adjunct instructional budget could be calculated.

Figure 1 (page 8) presents a simplified flowchart of the APEF system. In essence a historic record is used to project anticipated needs (credits and instructional hours) for a forthcoming semester. This information is transmitted to academic departments for their review. The departmental requested modifications are studied by the Dean of Instruction for conformity to College policy but more importantly to insure that the overall costs of the adjunct hours being requested are within budgetary limits and when approved establish the "maximum hours control". These approved "echo" forms are returned to the departments so that they may make specific adjustments to the "historic" file to bring it within the hourly limitations assigned each department. So long as the changes which may be necessary due to student demand, faculty requests, etc. fall within approved maximums the department is free to adjust its schedule.

The APEF System was introduced for the Spring '83 Semester and performed quite well during its initial break in period. A minimum number of "bugs" were detected but these proved to be easily resolved. After making necessary adjustments the APEF program was used to project total annual adjunct costs for Fall '83 and Spring '84.

At the conclusion of the registration period for Fall '83 a "final" APEF projection was produced and compared with the actual figures for that semester. The results were most impressive as shown by the following table:

COMPARISON OF APEF PROJECTIONS WITH ACTUAL FIGURES - FALL 1983

	Projected	Actual
Total Instructional Hours	7,972	8,144
Full Time Available Hours	5,122	5,274
Adjunct Hours Required	2,850	2,870
Adjunct Cost	$1,536,155	$1,536,342

D. Program Outgrowths

While the introduction of APEF has apparently resolved a serious problem which had been plaguing the Office of Academic Affairs, it has, not unexpectedly, created new avenues towards the solution of related problems. This may be the most significant lesson to be learned from our involvement with personnel from our Computer Center. The old adage, "nothing succeeds like success", has been confirmed. For as we have gained confidence in what a properly analyzed and constructed program can do, so have we become more willing to turn to the computer for solving other management problems.

An example of what has been accomplished as an offshoot of APEF is our ability to now control enrollment in any specific section for which students are registering. Prior to Spring 1983 the "maximum class size" listed for a section merely signified a previously agreed upon number which should not be exceeded. In some instances, however, a department would overload a section and then insist that it be split in the interests of "maintaining educational standards". The unfortunate outcome of such action was an increase in adjunct costs.

We now have the ability to introduce computerized controls on class sizes, i.e., once an authorized enrollment is reached, the next registrant will receive a message on the terminal, "section closed", when he/she attempts to enroll. If the department requests special consideration for a student, it is possible to override the controls via an overtally card issued by the Office of Academic Affairs.

Furthermore, it is now possible to access via the terminal, in real time, the enrollment in any section or group of sections. In this way the office can be alerted to situations which may require the creation of additional sections. Using data from APEF, we know whether funds are available to permit such action.

In our enthusiasm, we created a system so "airtight" that it provided no flexibility whatsoever. Thus, if a department exceeded its projected allocation by even $1.00, not one more appointment card for adjunct personnel could be processed by the budget control office. This was unrealistic since the original departmental dollar allocations had been made based on average salary rates.

We have subsequently modified our control program from a departmental cost center focus to a college "bottom line". So long as we do not exceed the APEF total dollar projection, cards will be processed. Reconciliation and adjustments are done after the fact.

Based upon our success in developing the APEF program we are now ready to tackle more complicated problems. In this connection we have created tables of pre and co-requisites for all courses offered by the college. This will enable us to control student registration into these courses and hopefully improve our retention rate. Ultimately, we hope to apply historic data re student enrollment patterns to project our needs for specific numbers of sections on our Master Course File.

III. Conclusion

When the user knows what he wants and can provide concise logical specifications, he'll get what he wants. When the computer people receive, take the time to thoroughly analyze and understand these specifications, systems development stands a chance of success. Furthermore, when both sides can sit down together and, in a spirit of cooperation, understand exactly what the end result of the system should be, the chances of success are significantly increased.

FIGURE # 1

CREATION OF AFFORDABLE MASTER COURSE FILE (MCF)